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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/585,858	07/12/2006	Yusuke Fukuoka	900-556	7745

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EXAMINER	
FORD, NATHAN K	
ART UNIT	PAPER NUMBER
1792	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/585,858	FUKUOKA ET AL.	
	Examiner	Art Unit	
	NATHAN K. FORD	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 February 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7 and 27-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,27 and 31-34* is/are rejected.

7)☒ Claim(s) *28-30* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/23/10*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application.
6) ☐ Other: _____.

DETAILED ACTION

Applicant's Response

Acknowledged is the applicant's request for continued examination received February 12, 2010. Claim 1 is amended; claims 8-26 are canceled; claims 27-34 are new. The substitute specification has been entered. All USC 112 rejections are withdrawn.

The applicant contends that the prior art does not anticipate or render obvious the current iteration of claim 1. The claim now recites the feature of a conveying arm that contacts the tray. In contrast, Hassan only avails a conveying arm to tilt a section of the track -- the arm does not contact the tray.

The examiner acknowledges that Hassan's "arm" does not contact the wafer or an incorporated wafer tray; the previous rejections are withdrawn accordingly. However, upon further consideration, a new rejection is submitted which addresses this limitation.

Priority

Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on January 30, 2004. As the International Bureau has not provided a certified copy of the foreign priority application, the applicant is requested to file a certified copy of the Japanese application as required by 35 U.S.C. 119(b).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-2, 7, 27, and 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toshifumi et al., JP 02-130849, in view of Hassan et al., US 4,348,139, and Iwasaki et al., US 5,174,881.

Claims 1, 7: Toshifumi discloses a conveyor system for semiconductor wafers. The conveyor track comprises a plurality of holes (4, 5) through which gas is injected to suspend the wafer. Further, various pins (7) connected to a driver (6) secure and translate the wafer along the track. This arrangement of the engagement pins, the driver, and the actuator (8) compose the "conveyance arm." It should be noted that Toshifumi's invention is drawn narrowly to

the technique of conveying a wafer along an air track and is silent regarding the other constituents of the semiconductor processing system in which the invention is to be employed.

In supplementation, Hassan discloses a fully articulated semiconductor processing system which avails an air track and further comprises:

- A plurality of vacuum chambers for processing a substrate (4, 9-34; Fig. 1);
  - Wherein an exhaust device must be inherently connected to each chamber to effect a vacuum (9, 53-57);
- A guide plate arranged at the bottom of each vacuum chamber (Fig. 10b);
  - Wherein each plate has a plurality of gas emission holes (124) (5, 40ff; 9, 45-50);
  - Wherein a gas supply source must be present inherently to provide gas to the emission holes;
- A substrate mounted on the guide plate;
- Wherein a shutter (123) is disposed between the vacuum chambers (9, 45-50);
- A mechanism which controls (9, 45-65):
  - The opening of the shutter;
  - The emission of gas through the emission holes;
  - The movement of the tray, whereby the tray is floated by the emitted gas, from the guide plate of one chamber to the guide plate of an adjacent chamber via the conveying arm.

It would have been obvious to augment Toshifumi's conveyance track with these features to commission the fabrication of semiconductors. It is worthy of attention that Hassan's air track is configured such that a conveyance arm is not required for wafer translation, but the examiner nevertheless maintains that since both Hassan's and Toshifumi's technique of wafer conveyance achieves the equivalent result of moving a wafer along an air track, the selection of either alternative would have been obvious to the skilled artisan.

Lastly, Toshifumi does not interpose a tray between the air track, i.e., the guide plate, and the wafer. Iwasaki is thus cited to cure the deficiency (Fig. 11). The teaching elaborates a semiconductor processing system wherein multiple wafers (4) are disposed atop a tray (30) which is conveyed along a track through a plurality of vacuum chambers (18, 57ff). This arrangement augments throughput by increasing the number of wafers that can be transported per unit time. Given this teaching, it would have been obvious to one of ordinary skill to transfer multiple wafers on a single, floatable tray to accelerate processing. Toshifumi's conveyance mechanism would certainly be amenable to this revision, as it can "cleanly convey an article of an arbitrary shape" (abstract). In

demonstration, the drawings of Toshifumi depict the conveying mechanism engaging circular, annular, and square substrates. Thus, the pins could easily be configured to accommodate the dimensions of a tray.

Claim 2: As described above, the movements of Hassan's shutter and rotatable section are controlled. Further, the air provided through the holes of the conveyance track is carefully modulated, and to achieve such control each structural feature recited by the applicant (supply source, valve, detecting part, etc.) must be inherently present within the system of Hassan (5, 40ff; 9, 13ff).

Claim 27: As stated above, the pins (7) of Toshifumi's conveying arm can be repositioned to accommodate the dimensions of the tray with a reasonable expectation of success. The portions of the tray which these pins engage will be taken to constitute the "engagement unit." As the pins are not permanently affixed to the tray, the limitation of "detachable engagement" is satisfied.

Claim 31: As the conveying arm traverses the air track, it will inevitably pass through the first vacuum chamber, and, for a period of time, be positioned squarely within that chamber.

Claim 32: In the invention of Toshifumi in view of Hassan, the arm is configured to convey a wafer along a track having a plurality of chambers sequentially disposed thereon. Thus, the arm is configured to move the article with which it is engaged from one vacuum chamber to an adjacent vacuum chamber.

Claims 33-34: The portions of the pins which contact the tray are taken as the "tray contact portion." As depicted in Figure 3 of Toshifumi, pin 7b pushes the rear end of the tray in its direction of movement.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toshifumi in view of Hassan and Iwasaki and in further view of Rigali et al., US 2004/0211516.

The cited prior art does not articulate a locking means. Rigali, however, discloses a track for workpiece conveyance outfitted with guide rails into which locking edges are inserted; this configuration ensures the alignment of the workpieces traversing the track [0059]. Given this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate guide rails to prevent any undesirable sideways movement (relative to the intended direction of conveyance) of the tray.

Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toshifumi in view of Hassan and Iwasaki and in further view of Baxter et al., US 2002/0139481.

Toshifumi is silent concerning the mechanisms which activate the driver. Even so, as Baxter demonstrates, it is well-known in the art to employ pulley mechanisms in the context of wafer conveyance. Specifically, Baxter employs two pulleys (70) to facilitate the manipulation of a substrate support arm and the rotation of substrate itself [0034, 37]. As would be apparent to one of ordinary skill, it would have been obvious to control the tension of the pulley wire to direct the movements of the conveying arm. Further, it would have been obvious to one of ordinary skill in the art at the time the invention was made to manipulate the conveyance arm of Toshifumi via pulley mechanisms to achieve the predictable result of transporting a substrate.

Allowable Subject Matter

Claims 28-30 are objected to as being dependent upon a rejected base claim but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 28 recites the feature of two engagement parts sequentially disposed along the tray, wherein the conveying arm engages each engagement part exclusively to enable the tray's piecemeal translation. The teachings of Toshifumi, Iwasaki, and Hassan represent the closest prior art, but none disclose a tray formed with multiple engagement parts. Although Toshifumi's conveying arm is capable of translating a tray, the arm is configured such that it engages every engagement part simultaneously -- that is, the arm is not capable of engaging only a first engagement part to move the tray a certain distance and then engaging only a second engagement part to move the tray the remaining distance. As there is no description in the prior art of such an embodiment, it is the examiner's opinion that the effort necessary to modify the cited references to arrive at the applicant's invention is beyond that of ordinary skill. Claims 28-30 are allowable for these reasons.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan K. Ford whose telephone number is 571-270-1880. The examiner can normally be reached on M-F, 8:30-5:00 EDT. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland, can be reached at 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/N. K. F./

Examiner, Art Unit 1792

/Michael Cleveland/

Supervisory Patent Examiner, Art Unit 1792